Katalin Bodnár: Household consumption expenditures and the consumer confidence index*

Household consumption constitutes two thirds of GDP in Hungary. Accordingly, in addition to influencing expected economic growth, consumption plays a prominent role in shaping pricing behaviour. Consequently, understanding and forecasting the consumption processes as precisely as possible can be of key importance to the operations of the central bank. The consumer confidence index, which has the earliest release date of all indicators measuring the consumption behaviour of households, may help achieve this goal. In this article, I examine what the confidence index measures, what makes it closely related to developments in consumption, and to what extent it can be used in forecasting those developments. It is found that the confidence index is reasonably good at explaining variables such as household income, the economic situation of the country, unemployment and developments in inflation, but that it tends to track these variables, rather than forecast them. However, questions related to these variables are incapable of fully grasping consumption decisions. Use of composite indicators derived from the questions with the best explanatory power may contribute to the explanation of certain sub-indicators, but even this fails to significantly improve the precision of short-term forecasts. In addition to the current economic situation, the index also reflects the effect of political cycles.
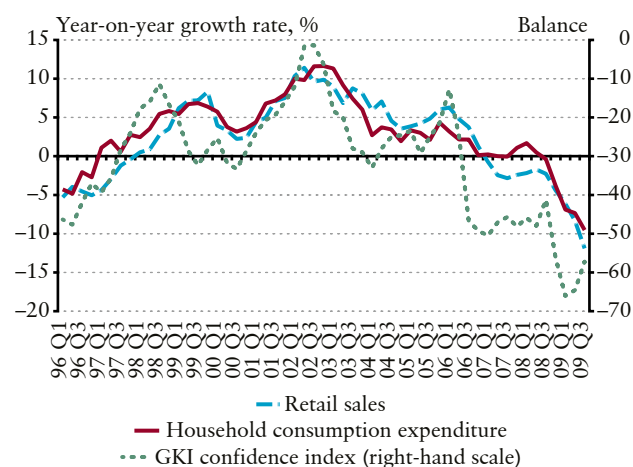
INTRODUCTION

In October 2008, the consumer confidence index – an indicator gauging the sentiment of domestic households – fell sharply as the financial crisis reached Hungary. The confidence index reached a historical low in April 2009, before returning to pre-crisis levels by December. Simultaneously, the macro indicators of consumption have followed a downward trajectory in recent quarters, suggesting that developments in consumption expenditures do not reflect the improvement in households' sentiment (see Chart 1). The magnitude of divergence between the two indicators has been unprecedented (the two indicators did not move in opposite directions even in the second half of 2006, when consumption only partly reflected the sharp decline in the confidence index).

The consumer confidence index is one of the earliest published indicators and is thus used in our short-term consumption forecasting models. Consequently, it is important to carefully examine whether the questions designed to gauge the confidence of households are reliable measures of the relevant variables, and whether the various composite indicators provide a good forecast of the macro variables of consumption. The confidence index may capture certain factors, which either cannot be measured by any other indicators or are only reflected in such with a lag, but which may nonetheless play a role in consumption decisions.

Chart 1

Annual growth of consumption expenditures and retail sales vs. developments in the GKI confidence index

In this analysis, I begin by looking at whether the questions of the confidence index are reliable measures of the related variables and the various macro indicators of consumption and its sub-components. Following this, I examine the composite indices derived from the questions to find the one with the best explanatory and forecasting power. Finally, I attempt to identify the macro variables that explain the movements of the confidence indicator, and seek an explanation for the recent divergence between consumption and the confidence index.

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* The views expressed in this article are those of the author(s) and do not necessarily reflect the offical view ot the Magyar Nemzeti Bank.

POSSIBLE EXPLANATIONS FOR THE CO-MOVEMENT OF THE CONFIDENCE INDEX AND CONSUMPTION

There are several potential explanations for the co-movement between the confidence index and consumption. These can be summarised (cf. Fuhrer, 1993; Carroll et al., 1994; Ludvigson, 2004; Wilcox, 2008; and Jonsson and Lindén, 2009) as follows:

I. Regardless of actual changes in income and income expectations, changes in confidence cause changes in consumption. One of the channels of this phenomenon is when, assuming a constant level of income, an increase in confidence (for example, due to a decline in uncertainty anticipated by households) moderates precautionary savings considerations[1] and thereby increases actual consumption. In other words, the independent explanatory power of confidence is consistent with a higher degree of consumer 'myopia', which results in a closer correlation between actual income and consumption (as opposed to the path to be expected from the permanent income hypothesis[2]).

II. The confidence index merely *measures* or *forecasts* something that causes changes in consumption. This could be

1) *the current macroeconomic situation*. To the extent that the confidence index simply reflects the current macroeconomic situation, the macro variables and the related questions of the confidence index survey move in tandem, and the confidence index does not have any additional explanatory power with respect to the macro variables. However, if it does give a forecast, it may have additional explanatory power in the short term.

2) *households' specific perceptions or expectations of changes in the macroeconomic situation*. Households may assess past or expected shocks differently than economists, which may be reflected in their consumption decisions. This is difficult to decipher in macroeconomic variables. A possible reason for this phenomenon is the heterogeneity of the population: if the groups affected differently by macroeconomic shocks exhibit different consumption

behaviour, the confidence index may help to understand consumption changes. According to a hypothesis of Wilcox (2008), the confidence index survey may also reflect the expected effects of shocks, in relation to which no information is available on past experiences. If this assumption holds, households' responses to macro-oriented questions do not move in conjunction with the variables measured by such questions (such as GDP, consumer price index), but may still help to understand or forecast consumption expenditures.

3) *developments in actual consumption expenditures*. Even though consumers may not be well-informed about the current macroeconomic situation, they probably have a much better grasp of the changes in their own consumption expenditures. Consequently (provided that the respondents statistically represent households in the economy), we may assume that there is a relationship between the balance of responses to micro-oriented questions and aggregate consumption. Based on this hypothesis, micro-oriented questions may prove to be more helpful in explaining and forecasting consumption expenditures.

The approaches referred to above are not entirely mutually exclusive; thus the confidence index may simultaneously measure current developments in macro variables and actual changes in consumption expenditures. However, one common aspect of each approach is that while the confidence index may be used for a short-term forecast of consumption, it is not expected to determine households' long-term decisions.

THE GKI CONSUMER CONFIDENCE INDEX

In this article, I draw on the results of the confidence index survey conducted by GKI Gazdaságkutató Zrt.,[3] which has been available since 1993 and is published by the European Commission. The survey is based on a harmonised methodology used across the European Union, and consists of 12 monthly questions and 3 quarterly questions, whereby the available time series for the latter is shorter. The questions and the reply options are listed in Annex 1.[4] The survey is currently conducted by phone with a sample size of 1,000 persons.[5]

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[1] Precautionary savings are generated when consumers reduce their consumption by saving a portion of their income to cover future risks.

[2] For details on the permanent income hypothesis see, for example, Jakab M. and Vadas (2001).

[3] While several confidence surveys cover domestic households, due to the longer available time series and the possibility of international comparison, MNB uses the GKI index.

[4] Further details on the survey can be found on the websites of the European Commission and GKI (http://ec.europa.eu/economy_finance/db_indicators/surveys/index_en.htm, http://www.gki.hu/hu/konjunkturakutatas/methodology.html).

[5] The sample size was 1,000 before 2002, 1,500 between 1 January 2002 and 31 December 2008, and 1,000 once again from 2009 on.

Table 1

The GKI and the MNB composite indices

GKI before 2002	GKI from 2002	MNB
Q1: household's financial situation, past	Q2: household's financial situation, expected	Q3: country's economic situation, past
Q2: household's financial situation, expected	Q4: country's economic situation, expected	Q4: country's economic situation, expected
Q3: country's economic situation, past	Q7: unemployment, expected	Q5: cost of living, past
Q4: country's economic situation, expected	Q11: savings, expected	Q7: unemployment, expected
Q8: high-value consumer goods, present		

Of the monthly questions, five are related to micro-level decisions or expectations (i.e. individual consumption and saving decisions of households), while seven questions cover a specific macroeconomic process (the economic situation of the country, inflation, unemployment, the reasonability of saving and purchasing durables). Six questions are retrospective or refer to the present time, while six questions refer to the 12 months following the survey. Quarterly questions are forward-looking and refer to micro-level decisions (real estate purchase or construction, home improvement expenditures, motor vehicle purchase). The questions have 3, 4 or 5 possible answers, which are balanced, i.e. they are "distanced" equally from one another (Tóth, 2002; European Commission, 2007). Most reply options are symmetrical (e.g. got a lot worse/got a little worse/remained the same/got a little better/got a lot better), except question 5 and question 6, which enquire about the extent of the consumer price increase.

Individual responses are aggregated by means of balances, which are calculated by using the following equation:

Balance = ratio of very positive replies + 0.5* ratio of slightly positive replies – 0.5* ratio of slightly negative replies – ratio of very negative replies.

(Except in the case of question 8, which has one positive, one neutral and one negative reply option only).

Thus, the weight of the very positive (negative) and slightly positive (negative) replies relative to one another is different in the balance indicator. As respondents make their assessment on the basis of a subjective scale, this solution is ambiguous: we have no way of knowing how a very negative reply of a respondent relates to the same respondent's slightly negative expectation or to the very negative reply of another household. However, this balance calculation is an attribute that we cannot deviate from. An important consequence of the formula applied in the calculation of the equation is the fact that a decline in the ratio of very negative replies and a simultaneous increase in the ratio of slightly negative replies
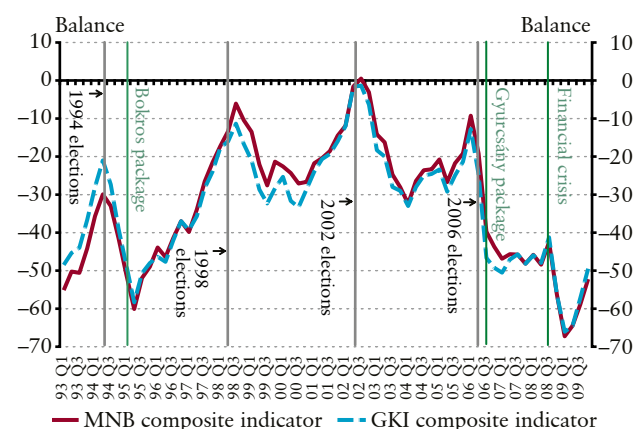
will translate into improvement in the confidence index. If the same weight was applied to the ratio of very negative and slightly negative replies, the case would be different.

Of the fifteen questions, only four are included in the composite index (before 2002 the index was constructed from the balance indicator of five, partially different questions), with the same weight. These four questions are the same for all countries covered by the survey. With respect to domestic data, however, Vadas (2001) found that a composite index with a different composition performs better in forecast models. The range of questions used in the aggregated indices is shown in Table 1.

Chart 2 shows the developments in the confidence indices of the MNB and GKI. The index noticeably tracks political cycles and responds to more severe macroeconomic shocks. In addition, the movements of the two composite indices are evidently similar. On the one hand, this is due to the fact that they are partly composed of the same questions, while on the other hand, it should be noted that all questions of the confidence index are closely correlated, and thus the path of the composite indices derived from such does not exhibit significant differences either.

Chart 2

GKI and MNB composite indices, political cycles and larger macroeconomic shocks

EMPIRICAL RESULTS

In the empirical analysis, I first examine whether the individual questions are good measures of the variables to which they refer. Next, I explain and forecast consumption and its sub-components using the individual questions as explanatory variables, and subsequently on the various composite indices. Finally, reversing the direction of the analysis, I attempt to explain changes in the confidence index by means of macro variables.

I measure consumption and its sub-components with a number of variables. I examine both the consumption and final consumption of households. Although the category directly predicted by the econometric models is the consumption expenditures of households, a longer time series is available for studying final consumption – which also includes the consumption of non-profit institutions serving households as well as government transfers – and the same time series allows for comparability with the findings of Vadas (2001). In addition, I also examine the specific sub-components of consumption expenditures:

retail sales, which account for a significant part of trade in goods; durable sales[6] and new motor vehicle purchases. I use real disposable income to approximate the income of households, while financial worth is measured by the stock of financial assets. Since the time horizon of the questions is one year, the estimates include the annual growth rate of the examined macro variables, while in the case of confidence index variables I use their actual levels (unless indicated otherwise). The data used are quarterly data pertaining to the period between 1993 Q1 and 2009 Q4 (certain time series are only available for a shorter period of time). The description of the data is included in Annex 2.

INDIVIDUAL EXPLANATORY POWER OF INDIVIDUAL QUESTIONS

One factor in the relationship between the confidence index and the macro indicators of consumption is whether the individual questions measure the variables to which they refer correctly. Therefore, it is expedient to begin an examination with these relationships. Table 2 indicates the

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Table 2

Explanatory power of specific questions

Question of the confidence index survey	Macro variable	Regressions	Cross correlation
Q1: Past financial situation of the household	Real net wage bill	contemporaneous	contemporaneous
Q2: Future financial situation of the household	Real net wage bill	contemporaneous, T-1	contemporaneous
Q3: Past economic situation of the economy	GDP growth	contemporaneous	contemporaneous
Q4: Future economic situation of the economy	GDP growth	contemporaneous	contemporaneous
Q5: Past developments in consumer prices	CPI, core inflation	contemporaneous, T-1	contemporaneous
Q6: Future developments in consumer prices	CPI, core inflation	contemporaneous, T-1	T-1 (core inflation), T-2 (CPI)
Q7: Future developments in unemployment	Changes in unemployment	contemporaneous, T-1	contemporaneous
Q8: Is it worth spending on high-value consumer goods?	Retail and durable sales	-	-
Q9: Do you plan to buy high-value consumer goods in the future?	Retail and durable sales	contemporaneous	contemporaneous
Q10: Is this a good or bad time for saving?	Gross financial savings	-	-
Q11: What is the probability of your being able to save money in the next 12 months?	Gross financial savings	-	-
Q12: Financial situation of household	Real net wage bill, net financial savings	contemporaneous, T-1, T-2 (net savings)	contemporaneous (real net wage bill)
Q13: Plans to purchase a motor vehicle within a year	New car sales, total car sales	-	-
Q14: Plans to purchase a home or a flat or to build a house within a year	Housing investment	contemporaneous	T-1
Q15: Plans to spend a substantial amount on home improvement within the next two years	Retail and durable sales	-	-

Note: the third column shows which lag of the confidence index question proved to be significant in the estimated equations, while the fourth column shows with which lag of the confidence index question the explained variable exhibits the strongest correlation (e.g. T-1 indicates the one-period-lagged value).

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[6] Durables include furniture and mechanical equipment sales, as well as motor vehicle and vehicle parts sales from the statistics of retail sales.

macro variables which are directly comparable to individual questions.

In this analysis, I prepare estimates, the statistics of which are appropriate, and include the contemporaneous or lagged values of a specific question as an explanatory variable, the lagged values of the interpreted variable and/or a lagged income or asset indicator. In addition, using cross correlations[7] I also examine the degree of co-movement between the questions of the confidence index and the related macro variable. The main difference between the two approaches is that the cross correlation coefficient reflects the unconditional relationship between two variables, while regressions are used to examine their conditional relationship (in other words, in case of the latter we examine the degree of correlation between two variables if other factors are unchanged). Neither method, however, is suitable for the examination of a cause and effect relationship.

Based on the regressions and the cross correlations, I find co-movement in the case of questions related to the financial situation and net saving position of households, as well as to consumer prices, unemployment rate and the economic situation of the country (see Table 2; detailed results of the estimates are presented in Annex 3). As a surprising result, I found that questions related to consumption decisions did not perform very well. While I found explanatory power in the case of the contemporaneous term regarding the question about future spending on durable goods, the retrospective question and the question related to major home improvement expenditures lack explanatory power. In the case of the questions related to housing investment, the one-period-lagged value of the confidence index question exhibited the strongest correlation with the data; however, in the equations the estimated coefficient of the contemporaneous term proved to be significant. The latter equations, however, are rather unstable.

Overall, based on the survey it appears that, in the case of macro variables (such as the economic situation of the country, inflation, unemployment), domestic households answer the relevant questions correctly, and the questions related to their own financial situation also exhibit a strong correlation with the measured income variable. However, we cannot find convincing results for consumption – saving decisions. This suggests that the replies to the questions of

the confidence index react to changes in the macroeconomic situation and measure those changes the best, while questions related to specific consumption items do not perform well.

INDIVIDUAL QUESTIONS VS. CONSUMPTION INDICES

The second step of the examination is to identify the individual questions which have the strongest connection with the five consumption indices listed above. For this I estimate the following equations:

$$(1) \qquad Y_t = \alpha + \sum_{j=1}^{2} \gamma_j Z_{t-j} + \varepsilon$$

$$(2) \qquad Y_t = \alpha + \sum_{i=0}^{2} \beta_j CCI_{t-i}^{k} + \sum_{j=1}^{2} \gamma_j Z_{t-j} + \varepsilon$$

where Y is the consumption variable to be explained, vector Z contains the one and two-period-lagged values of the explained variable and that of real income and net financial assets, and CCI^k is the kth question of the confidence index. The equation contains the latter's contemporaneous term, as well as its one-period-lagged term and two-period-lagged term.[8] The explanatory power of specific questions is demonstrated by the difference between the explanatory power[9] of equations (2) and (1), and by the joint significance of the confidence index questions' coefficients (see Table 3).

Based on this exercise, I find that the best performers of the confidence index questions are questions 3, 4 and 7: for most consumption variables these questions had additional explanatory power relative to the macro variables. In other words, the best questions to measure the factors affecting the consumption decisions of households are those related to the economic situation of the country and the expected changes in unemployment. Of these, expected changes in unemployment generate the strongest increase in the explanatory power in the case of equations measuring specific variables. These results are consistent with the findings of Vadas (2001), the only exception being the balance indicator of question 5 (past developments in consumer prices) which, in the current analysis, did not prove significant in the equations. In the case of durables

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[7] The cross correlation examines the correlation between different lagged and leading values of the variables.

[8] I have also estimated another equation form, which contained values with a lag of 1-4 periods; however, lag 3 and lag 4 were never significant, while the contemporaneous balance indicator often exhibited the strongest cross correlation. Another reason for keeping the contemporaneous term in the equation is the fact that this information is released the earliest.

[9] The explanatory power is measured by the adjusted R^2 index. The R^2 index indicates the proportion of variability in the dependent variable accounted for by the estimated equation. The adjusted R^2 modifies this indicator by the number of variables with no significant explanatory power.

Table 3

Explanatory power of specific questions in respect of macro indicators of consumption

	FINAL CONSUMPTION	CONSUMPTION EXPENDITURES	NEW CAR SALES	DURABLES CONSUMPTION	RETAIL SALES
Q1	**0.00**	0.00	**0.04**	0.00	0.00
	(0.08)	(0.20)	**(0.01)**	(0.26)	(0.12)
Q2	**0.00**	0.00	0.01	0.01	0.00
	(0.05)	(0.30)	(0.11)	(0.10)	(0.36)
Q3	**0.01**	0.00	0.01	**0.01**	**0.01**
	(0.00)	(0.24)	(0.13)	**(0.04)**	**(0.03)**
Q4	**0.01**	0.00	0.02	**0.02**	**0.01**
	(0.00)	(0.19)	(0.10)	**(0.02)**	**(0.04)**
Q5	0.00	0.00	0.01	0.00	–0.01
	(0.33)	(0.49)	(0.12)	(0.58)	(0.60)
Q6	**0.00**	0.00	–0.01	0.00	–0.01
	(0.05)	(0.47)	(0.83)	(0.28)	(0.80)
Q7	**0.02**	**0.01**	**0.02**	**0.01**	**0.01**
	(0.00)	**(0.07)**	**(0.07)**	**(0.06)**	**(0.06)**
Q8	**0.01**	0.00	0.01	0.02	0.00
	(0.03)	(0.28)	(0.19)	(0.14)	(0.17)
Q9	0.00	0.00	0.01	0.01	–0.01
	(0.14)	(0.34)	(0.14)	(0.22)	(0.75)
Q10	0.00	0.00	–0.01	0.01	–0.01
	(0.14)	(0.91)	(0.70)	(0.14)	(0.40)
Q11	0.00	0.00	0.01	0.01	–0.01
	(0.32)	(0.16)	(0.21)	(0.45)	(0.88)
Q12	**0.01**	0.00	0.01	**0.02**	**0.02**
	(0.00)	(0.13)	(0.21)	**(0.01)**	**(0.03)**
Q13	0.00	0.02	**0.08**	0.00	0.02
	(0.34)	(0.38)	**(0.06)**	(0.39)	(0.51)
Q14	0.00	0.02	0.07	0.00	0.01
	(0.76)	(0.52)	(0.10)	(0.26)	(0.76)
Q15	0.00	0.02	**0.08**	–0.01	0.02
	(0.51)	(0.35)	**(0.03)**	(0.62)	(0.23)

Note: the numbers in the table indicate the difference between the adjusted R^2 of the equations including both macro variables and confidence index questions and equations including only the confidence indices. The p-values of the F-tests measuring the joint significance of confidence index questions are presented in parentheses. Cells with bold numbers indicate that the coefficients of the confidence index proved to be jointly significant.

and retail sales, question 12 – which measures the financial position of households – was also able to increase the explanatory power.

COMPOSITE INDICES AND CONSUMPTION

While the individual questions are rather useful in their own right, they merely ask about one consumption item or one factor affecting consumption; therefore, more information can be gained by combining the different questions. Although the correlation of balance indicators received for individual questions is quite high, there may be substantial differences in their explanatory power.

In this analysis, I compare the explanatory and forecasting power of 9 composite indices. In addition to the (GKI) index released by the European Commission which combines 4 questions, we also draw on the (MNB) index, the calculation of which is based on the findings in Vadas (2001). However, based on the examination described above, we concluded that past developments in the costs of

Table 4

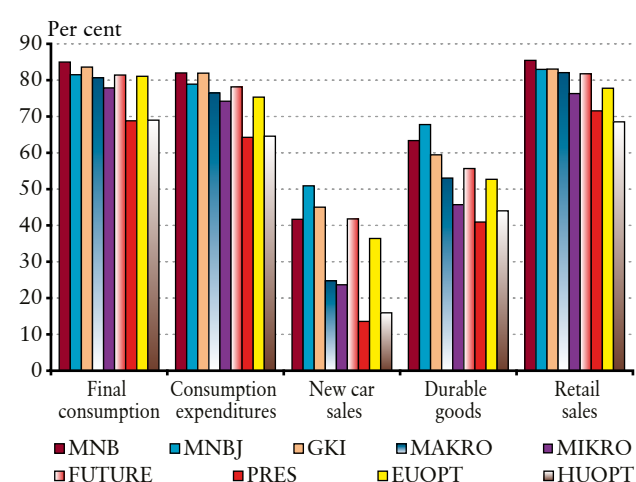**Calculation of the composite indices tested in the study**

	MNB	MNBJ	GKI	MAKRO	MIKRO	FUTURE	PRES	EUOPT	HUOPT
Financial position of the household					X		X		
Expected financial position of the household			X		X	X			X
Economic situation of the economy	X	X		X			X	X	X
Expected economic situation of the economy	X	X	X	X		X			
Inflation, past*	X			X			X		
Inflation, future*				X		X			X
Expected unemployment*	X	X	X	X		X			
Durable purchase, present				X			X	X	
Durable purchase, future					X	X		X	
Savings, present				X			X		
Savings, future			X		X	X			
Financial wealth of the household					X		X		

* Questions 5, 6 and 7 are included in the composite indices with a negative sign, as an increase in the balance indicator in their case points to a deterioration of the factors determining consumption.

living should not be included here, and thus I exclude this item from my analysis of the efficiency of the composite index (MNBJ). Jonsson and Lindén (2009) examined every possible combination of all the questions of the consumer confidence indicator survey for all EU Member States, and they identified the best-performing combination both for Hungary (HUOPT) and for the EU as a whole (EUOPT). Moreover, I also examine how the composite indices containing exclusively micro-oriented questions (MICRO) and those containing exclusively macro-oriented questions (MACRO) perform relative to one another, even though on the basis of the previous section it may be assumed that micro-oriented questions do not have significant explanatory power. Finally, a composite index may be compiled from forward-looking questions (FUTURE), as well as questions referring to the past and the present (PRES). Examining their explanatory power in pairs and relative to the other indices may yield important information. The composition of specific composite indicators is presented in Table 4.

The estimates are identical with those described in the previous analysis, with the exception that instead of individual questions the equations now include the composite indices. First, I examine the extent to which the composite index and its lagged values account for the variance in the macro indicators of consumption in their own right. This test (Chart 3) suggests that each composite index explains a significant part of the variance of consumption; however, the GKI index and the two MNB

indices perform the best. The worst-performing indices are those that include questions pertaining to the present and the one that was found best for Hungary by Jonsson and Lindén (2009). Based on the pair-comparison, macro-oriented questions perform better than micro-oriented ones, forward-looking questions are better than retrospective ones; however, the explanatory power of the index found optimal for Hungary by Jonsson and Lindén (2009) is lower

Chart 3

Explanatory power of composite indices

Note: the chart indicates the adjusted R^2 of the estimated equations. According to the F-tests, the joint coefficients of the composite indices were significant in all equations.

Table 5

Additional explanatory power of composite indices vs. equations including macro variables only

	MNB	MNBJ	GKI	MAKRO	MIKRO	FUTURE	PRES	EUOPT	HUOPT
Final consumption	0.00	**0.01**	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00
	(0.17)	**(0.02)**	**(0.07)**	(0.27)	(0.26)	(0.21)	(0.40)	(0.20)	(0.38)
Consumption expenditures	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.33)	(0.14)	(0.17)	(0.38)	(0.22)	(0.33)	(0.36)	(0.19)	(0.45)
New car sales	**0.02**	**0.02**	0.01	0.01	0.01	0.01	**0.02**	**0.02**	0.00
	(0.09)	**(0.06)**	(0.13)	(0.15)	(0.11)	(0.21)	**(0.06)**	**(0.08)**	(0.29)
Durables consumption	**0.01**	**0.02**	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	(0.06)	**(0.05)**	(0.11)	(0.13)	(0.16)	(0.09)	(0.17)	(0.20)	(0.11)
Retail sales	0.01	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.11)	**(0.05)**	(0.30)	(0.30)	(0.67)	(0.46)	(0.32)	(0.32)	(0.40)

Note: the numbers in the cells of the table indicate the difference between adjusted R^2 indices of the equations containing both macro variables and confidence index questions and equations containing only the macro variables. The p-values of the F-tests measuring the joint significance of composite indices are presented in parentheses. Cells with bold numbers indicate that the coefficients of the confidence index proved to be jointly significant.

than that of the one found optimal for the EU. At the same time, none of these specific indices was able to outperform the MNB and GKI indices.

Next, based on the methodology described in the previous Section, I examine the extent to which the models including the composite index as well as the macro variables generate incremental explanatory power relative to the models including macro variables only (Table 5). While none of the composite indices generated a significant increase in the explanatory power, the MNBJ index – which was derived from the three best-performing questions listed in the previous section – proved to be significant in the case of four of the examined consumption variables, and slightly improved the explanatory power. In addition, the MNB and GKI indices also contributed to the explanation of certain consumption categories. Apart from this, only the equation explaining car sales was found to have been improved by the PRES index and the EUOPT index, which includes the question about the current financial situation of households and plans for purchasing durable goods, respectively. Among the main consumption variables, the composite indices contribute to improving the explanatory power primarily in the case of final consumption, which may be partly ascribed to the fact that social benefits in kind granted by the

government tend to move in tandem with political cycles. Accordingly, final consumption, which includes this item, exhibits a closer relationship with the confidence index, and both of them are tangibly influenced by general elections.

For the same nine composite indices, it is a useful exercise to examine the extent to which they can improve the short-term forecasting of variables measuring consumption. This can be revealed by the difference between the forecast errors of the two equations shown above (equations [1] and [2]), i.e. the equation that includes macro variables only, and the one that also includes composite indices.[10] As was the case previously, the equations incorporate annual growth rates.[11]

Chart 4 shows the results of the one-quarter and three-quarter rolling forecasts. As illustrated in the Chart, the incorporation of confidence indices in the forecast equations does not contribute materially to the accuracy of the forecast: in fact, it often weakens the accuracy of the equations that include macro variables only. It is important to note, that in the period under review (2005–2009) the largest deterioration was observed close to the time of the elections in 2006 for nearly all composite indices in general and in particular for the variables measuring total
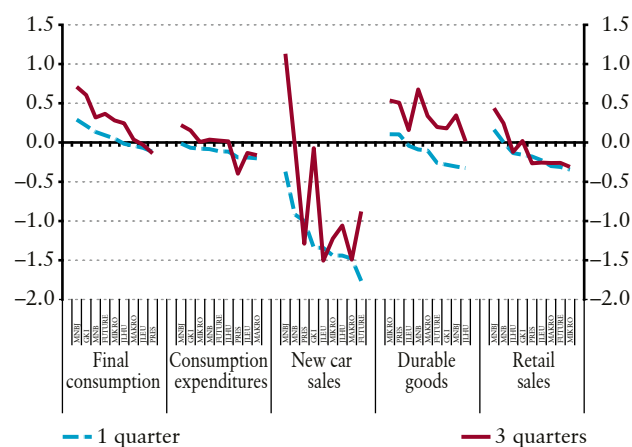
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[10] The forecast was estimated out-of-sample, i.e. the equation estimating the forecast did not include the forecast period. As a first step, I estimate the equation for the period between 1993 Q1 and 2004 Q4, and then prepared a forecast for 2005 Q1. Next, the estimation sample is supplemented by data pertaining to 2005 Q1, and the equation estimated on this basis is used to prepare a forecast for 2005 Q2. The same exercise is performed for all dates up to 2009 Q3. The forecast error can be measured by the RMSE index. The RMSE (root mean squared error) index is calculated on the basis of the following formula: $\sqrt{\sum_{t=T+1}^{T+h}(\hat{y}_t - y_t)^2/h}$, where $\hat{y}_t$ is the estimated value of the variable y_t, and periods T+1, ... T+h indicate the estimation period. Accordingly, in the case of a quarterly forecast the RMSE is the absolute value of the difference between the forecast and the actual value.

[11] Taking account of the forecast models, I have performed the same test for the variables expressed in dlog format, with similar results.

Chart 4

Additional forecasting power of specific composite indices

Note: the Chart indicates changes in the RMSE between the equation including the composite indices as well as macro variables and the equation including only macro variables. A positive figure indicates that the composite index improves the accuracy of the forecast, while a negative figure indicates that it deteriorates it. The calculations are based on a cumulative out-of-sample forecast for the period between 2005 Q1 and 2009 Q3.

consumption (with further deterioration observed in 2009 Q3). During these periods the forecast prepared on the basis of the composite index overestimated the actual value of the consumption variables, and the extent of the overestimation surpassed that of the equations including only macro variables. At the same time, it is also interesting that the confidence index improved forecast accuracy the most in the one or two quarters following the default of Lehman Brothers (September 2008, after which the financial turmoil reached Hungary); in other words, this is when it exhibited the most substantial additional information content.

Overall, confidence indices have not contributed significantly to forecasting the specific variables of consumption in the past 5 years. In most cases, the GKI index and the two MNB indices performed the best again, and of these indices the revised MNB composite index often outperformed the others. Regarding the variables, the composite index can be best employed for forecasting the total consumption expenditures of households. The predictive power of the indices can already be improved for a forecast three quarters ahead. However, the results depend on the period under review.
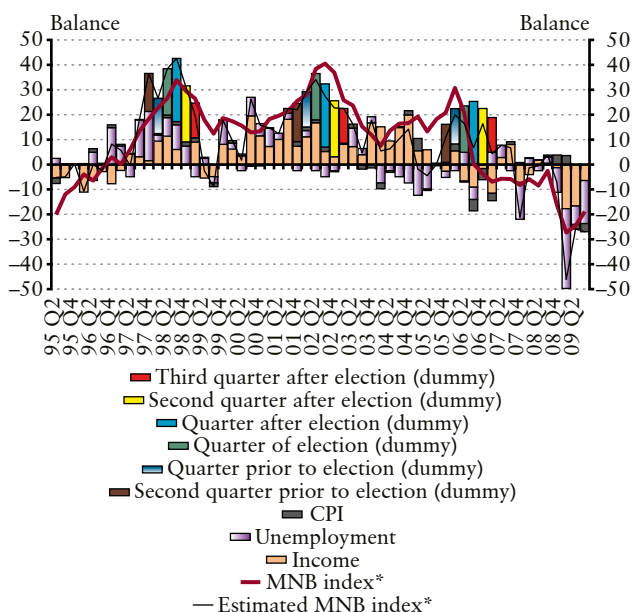
EXPLAINING MOVEMENTS IN THE COMPOSITE INDEX

In the final part of the analysis, I attempt to explain the movements of the composite confidence index. This may help explore why the confidence index has recently departed from the path of the consumption variables. For the explanation of the composite index I used the contemporaneous values of real disposable income, unemployment and the consumer price index,[12] and introduced dummy variables to indicate the quarter of the elections as well as the quarters before and after elections.[13] The latter was introduced because – as indicated in Chart 1 – prior to political elections the composite index tends to improve significantly, while its forecasting power deteriorates; thus we may assume that even though expectations improve, consumption decisions do not fully reflect this improvement.

The results of this analysis and the effects calculated on the basis of the estimated equation are shown in Chart 5. Among the examined variables, the primary determinants are real income and the date of political elections. I find that

Chart 5

Estimated effect of macro variables and the date of political elections on the MNB composite index

Note: the estimated constant term was deducted from the actual index and the estimated index shown in the Chart.

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[12] I have also attempted to use GDP and the real net wage bill instead of disposable income. However, these items proved to be less appropriate.

[13] Dummy variables are those variables which can only take a value of 0 or 1.

confidence improves significantly in the quarter preceding the elections and continues to improve in the following three quarters as well, but the most pronounced effect is observed during the quarter of the elections.

On the basis of the above analysis, I was unable to prove that the departure of the confidence index from consumption in 2009 Q3 resulted from the elections. Indeed, in the estimated equations the elections only influence confidence in the two quarters preceding the elections. On the other hand, this may have been the driving force behind the further departure observed in 2009 Q4. According to the indices available (such as retail sales), consumption declined significantly in Q4, while the already released confidence index data pointed to a further improvement in consumer sentiment.

A phenomenon referred by Al-Eyd et al. (2008) could offer an alternative explanation: at times of tighter liquidity constraints, the confidence index and consumption expenditures may deviate from one another. Liquidity constraints (declining wages, rising lending rates, contracting credit supply) – which have been strengthening since autumn 2008 and still appear unrelenting – may have contributed to the opposing developments in consumption and the confidence index.

CONCLUSIONS

In this article, I examined the explanatory as well as the forecasting power of the consumer confidence index, and also attempted to explain the confidence index by different factors. Based on the examination of individual questions, I arrived at the conclusion that they perform best in explaining the income of households and macro variables, while the questions and the macro variables did not exhibit a close relationship when it came to the consumption and saving decisions of households. Correlation and explanatory power appeared the strongest with contemporaneous terms. Total consumption as well as its components can be best explained by macro-oriented questions, i.e. those enquiring about the past and future economic situation of the country and unemployment. This may suggest that the confidence index primarily reacts to and reflects the current macro situation, but is less suitable for forecasting it.

In the second part of the analysis, I attempted to estimate the variables measuring consumption using different composite indices. Based on this exercise, I found that all the composite indices could in themselves account for a large part of the volatility of macro variables, but when the macro variables were also included in the estimation, the

confidence indices had very little additional explanatory power. In terms of total and additional explanatory power, the index composed of the three individual questions proved to have the strongest explanatory power overall.

Data from the past five years indicate that composite indices may have contributed to the accuracy of forecasting consumption indicators, but only to a small extent. At the same time, I found certain periods and certain composite indicators which reduced forecast accuracy. Presumably, including the consumer confidence index – which tends to increase significantly in periods close to political elections – in the equations may result in excessively optimistic consumption forecasts. This assumption is supported by the fact that, in the equations explaining the confidence indices, political cycles appeared to influence changes in the indices significantly: they increased their value during the two quarters preceding, and three quarters following the elections. Consequently, this can only partly explain the departure of the confidence index from consumption variables from the second half of 2009. Beyond this, strengthening liquidity constraints may have also contributed to the deviation of the variables.

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ANNEX 1 QUESTIONS AND REPLY OPTIONS OF THE GKI CONFIDENCE INDEX SURVEY

Monthly questions

1. How has the financial situation of your household changed over the last 12 months? It has...

a. got a lot better,
b. got a little better,
c. stayed the same,
d. got a little worse,
e. got a lot worse.

2. How do you expect the financial position of your household to change over the next12 months? It will...

a. get a lot better,
b. get a little better,
c. stay the same,
d. get a little worse,
e. get a lot worse.

3. How do you think the general economic situation in the country has changed over the past 12 months? It has...

a. got a lot better,
b. got a little better,
c. stayed the same,
d. got a little worse,
e. got a lot worse.

4. How do you expect the general economic situation in this country to develop over the next 12 months? It will...

a. get a lot better,
b. get a little better,
c. stay the same,
d. get a little worse,
e. get a lot worse.

5. How do you think that consumer prices have developed over the last 12 months? They have...

a. risen a lot,
b. risen moderately,
c. risen slightly,
d. stayed about the same,
e. fallen.

6. By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will...

a. increase more rapidly,
b. increase at the same rate,
c. increase at a slower rate,
d. stay about the same,
e. fall.

7. How do you expect the number of people unemployed in this country to change over the next 12 months? The number will...

a. increase sharply,
b. increase slightly,
c. remain the same,
d. fall slightly,
e. fall sharply.

8. In view of the general economic situation, do you think that now it is the right moment for people to make major purchases such as furniture, electrical/electronic devices, etc.?

a. yes, it is the good moment now
b. it is neither the right moment nor the wrong moment
c. no, it is not the right moment now

9. Compared to the past 12 months, do you expect to spend more or less money on major purchases (furniture, electrical/electronic devices, etc.) over the next 12 months? I will spend...

a. much more,

b. a little more,

c. about the same,

d. a little less,

e. much less.

10. In view of the general economic situation, do you think that now is...?

a. a very good moment to save,

b. a fairly good moment to save,

c. not a good moment to save,

d. a very bad moment to save.

11. Over the next 12 months, how likely is it that you save any money?

a. very likely,

b. fairly likely,

c. not likely,

d. not at all likely.

12. Which of these statements best describes the current financial situation of your household?

a. we are saving a lot,

b. we are saving a little,

c. we are just managing to make ends meet on our income,

d. we are having to draw on our savings,

e. we are running into debt.

Quarterly questions:

13. How likely are you to buy a car over the next 12 months?

a. very likely

b. fairly likely

c. not likely

d. not at all likely

14. Are you planning to buy or build a home over the next 12 months (to live in yourself, for a member of your family, as a holiday home, to let etc.)?

a. yes, definitely

b. possibly

c. probably not

d. no

15. How likely are you to spend any large sums of money on home improvements or renovations over the next 12 months?

a. very likely

b. fairly likely

c. not likely

d. not at all likely

ANNEX 2 DESCRIPTION OF THE INDICATORS USED

	Availability	Frequency
Questions of the GKI confidence index	1993–2009 Q3	Monthly (Three questions have quarterly frequency)
Final consumption of households at constant prices	1991–2009 Q3	Quarterly (data estimated before 1995)
Consumption expenditure of households at constant prices	1995–2009 Q3	Quarterly
Retail sales at constant prices	1998–2009 Q3	Monthly
Durable consumer goods at constant prices	1998–2009 Q3	Monthly
New car purchases of households at constant prices	1993–2009 Q3	Quarterly, MNB estimate
Housing investment of households at constant prices	1995–2009 Q3	Quarterly
Gross and net financial assets and savings of households (adjusted by revaluation effect)	1989–2009 Q3	Quarterly
Real net wage bill of households	1995–2009 Q3	Monthly
Real disposable income of households	1995–2009 Q3	Quarterly
Unemployment rate	1995–2009 Q3	Monthly
Inflation and core inflation	1995–2009 Q3	Monthly

Note: all data are seasonally adjusted.

ANNEX 3 EXPLANATORY POWER OF INDIVIDUAL QUESTIONS

Table 3-1

Results of the estimations

Dependent variable (Y)	Question	C	Q (T)	Q (T−1)	Q (T−2)	Y (T−1)	dRPDI (T−1)	dNFW (T−1)	Adj. R²	Number of observations
Real net wage bill	1	3.69	**0.08****	–	–	0.73***	–	–	0.83	54
		0.72	–	0.01	–	0.88***	–	–	0.81	54
		−1.09	–	–	−0.04	0.97***	–	–	0.82	54
	2	3.24***	**0.10*****	–	–	0.68***	–	–	0.85	54
		3.22***	–	**0.09*****	–	0.67***	–	–	0.84	54
		1.78	–	–	0.04	0.79***	–	–	0.82	54
	12	1.44*	0.14	–	–	0.80***	–	–	0.82	54
		0.79	–	0.05	–	0.86***	–	–	0.81	54
		0.18	–	–	−0.03	0.92***	–	–	0.81	54
CPI	5[1]	−0.14	**0.11*****	–	–	0.32***	–	–	0.28	65
		−0.15	–	**0.11****	–	0.26**	–	–	0.24	65
		−0.14	–	–	0.004	0.45***	–	–	0.17	65
	6[1]	−0.12	**0.07****	–	–	0.43***	–	–	0.21	65
		−0.16	–	**0.09****	–	0.35***	–	–	0.24	65
		−0.21	–	–	**0.09****	0.32**	–	–	0.26	65
Core inflation	5[1]	−0.11	**0.07****	–	–	0.46***	–	–	0.33	65
		−0.10	–	**0.05***	–	0.45***	–	–	0.31	65
		−0.10	–	–	−0.01	0.57***	–	–	0.28	65
	6[1]	−0.09	**0.06****	–	–	0.55***	–	–	0.33	65
		−0.13	–	**0.06****	–	0.47***	–	–	0.34	65
		−0.13	–	–	0.04	0.49***	–	–	0.30	65
Unemployment rate	7	−0.38***	**0.01*****	–	–	–	–	–	0.28	66
		−0.31***	–	**0.01*****	–	–	–	–	0.17	66
		−0.21**	–	–	**0.01****	–	–	–	0.06	66
Durable goods sales	8	−4.39	−0.04	–	–	0.78***	0.51	0.32	0.70	54
		−4.11	–	−0.03	–	0.78***	0.47	0.31	0.69	54
		−3.90	–	–	−0.03	0.78***	0.44	0.32	0.69	54
	9	7.10	**0.26***	–	–	0.74***	−0.30	0.47*	0.71	54
		1.47	–	0.13	–	0.75***	0.09	0.50*	0.70	54
		−2.99	–	–	0.01	0.79***	0.35	0.43	0.69	54
	15	8.10	0.13	–	–	0.92***	0.19	−0.18	0.87	39
		4.06	–	0.08	–	0.96***	0.16	−0.07	0.87	39
		0.92	–	–	0.04	0.99***	0.16	−0.008	0.87	39
Gross financial savings	10	−0.95	−0.01	–	–	1.04***	–	–	0.91	62
		−0.96	–	−0.01	–	1.04***	–	–	0.90	62
		−1.01	–	–	−0.01	1.04***	–	–	0.90	62
	11	−0.01	0.01	–	–	1.03***	–	–	0.90	62
		−0.42	–	0.002	–	1.04***	–	–	0.90	62
		−0.51	–	–	0.001	1.04***	–	–	0.90	62
Net financial savings	12	0.12	**−0.08****	–	–	0.94***	–	–	0.90	62
		0.18	–	**−0.09****	–	0.93***	–	–	0.91	62
		0.25	–	–	**−0.11****	0.91***	–	–	0.91	62
New car sales	13	−18.09	−0.13	–	–	0.97***	0.88	0.59	0.77	39
		−13.21	–	−0.07	–	0.91***	0.80	0.62	0.81	39
		−4.73	–	–	0.02	0.91***	0.69	0.48	0.81	38
Retail car sales	13	−0.18	0.04	–	–	0.99***	0.36	0.16	0.85	39
		4.21	–	0.09	–	1.01***	0.23	0.13	0.86	38
		5.15	–	–	0.11	1.00***	0.18	0.18	0.86	37

*Note: the columns of the explanatory variables indicate the value of the estimated coefficients. The *, ** and *** symbols denote confidence intervals of 10, 5 and 1 percent.*

[1] *For Question 5 and Question 6 the explanatory variable is not the level of, but the change in the balance indicator.*

Table 3-2

Estimates pertaining to the economic situation of the country and housing investment

Dependent variable (Y)	Ques-tion	C	Q (T)	Q (T–1)	Q (T–2)	Y (T–1)	Y (T–2)	Y (T–3)	dRPDI (–1)	dNFW (–1)	Adj. R²	Number of observations
GDP growth	3	0.72	**0.01***	–	–	1.63***	–0.74***	–	–	–	0.94	52
		0.42	–	0.01	–	1.67***	–0.74***	–	–	–	0.94	52
		0.53	–	–	0.01	1.70***	–0.78***	–	–	–	0.94	52
	4	0.63*	**0.02****	–	–	1.58***	–0.71***	–	–	–	0.94	52
		0.29	–	0.01	–	1.65***	–0.72***	–	–	–	0.94	52
		0.35	–	–	0.01	1.68***	–0.76***	–	–	–	0.94	52
Housing investment*	14	5.86	0.06*	–	–	2.44***	–2.46***	1.21***	–0.05	–0.02	0.99	39
		2.58	–	0.03	–	2.49***	–2.47***	1.12***	–0.05	0.004	0.99	38
		1.44	–	–	0.02	2.46***	–2.38***	1.03***	–0.05	0.02	0.99	37

*Note: the columns of the explanatory variables indicate the value of the estimated coefficients. The *, ** and *** symbols denote confidence intervals of 10, 5 and 1 percent.*